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BONE MINERAL DENSITY IN FEMALE MEDICAL STUDENTS RESIDING IN HOSTEL, A SINGLE-CENTER STUDY

Hamayun Suqrat Hassan Imam[a], Uzma Sagheer[b], Tahir Ismail[c], Muhammad Khalid Saddiqui[d]

[a]Professor Department of Community Medicine, Aziz Fatima Medical and Dental College, Faisalabad.
[b]Senior Demonstrator, Department of Community Medicine, Aziz Fatima Medical and Dental College Faisalabad.
[c]Assistant Professor, Department of Community Medicine, Faisalabad Medical University Faisalabad.
[d]Ex. Assistant Professor, Department of Community Medicine, Faisalabad Medical University Faisalabad.

ABSTRACT:

BACKGROUND & OBJECTIVE: Osteopenia is a condition in which bone mineral density (BMD) is decreased. If not timely prevented, it can be aggravated to severe osteoporosis and a risk for fractures. Our objective was to find out the frequency of osteopenia and osteoporosis in female medical students residing in hostel of Punjab Medical College Faisalabad.

METHODOLOGY: A Cross-sectional study was conducted in Liaqat and Fatima hall of Punjab Medical College Hostel, Faisalabad from 1st June 2014 to 31st August 2014 after ethical review committee approval. By using non probability convenient sampling technique, 212 female students of MBBS residing in Punjab Medical College Hostel were included in study. Predesigned questionnaire was used to collect data.Data was analyzed by using 17 version of SPSS.

RESULTS: Out of 212 females, the age of 70 (33%) females was <20 years, the age of 80 (38%) females was 21-22 years and 62 (29%) females was ≥ 23 years. The frequency of osteoporosis was 81(38%), osteopenia was 123 (58%) and normal females were only 8 (4%). In relation to regular exercise, significant association was observed with p <0.001.

CONCLUSION: Frequency of osteopenia and osteoporosis was high among female medical students. To address this serious public health issues, health education should be provided.

KEYWORDS: Osteoporosis, Bone mineral density, Osteopenia.

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INTRODUCTION:

Osteopenia is defined as a condition in which bone mineral density (BMD) is low or decreased. If not timely prevented, it can aggravate to severe osteoporosis and increase risk for fractures [1].Nearly nine million people suffered from osteoporosis fracture worldwide. Osteoporosis is a global health issue, Globally, it is estimated that one third of women and one fifth of men suffered from osteoporosis and fracture of bone. A prelude inquiry in Hong Kong disclosed that 35% of adult workplace staff were affected from either with osteoporosis or osteopenia[2]. According to WHO, osteopenia is defined as a T-score between -1 to -2.5[3]. Bone Mineral Density (BMD) defines outcome measurements such as subsequent fracture risk and mortalityas, T-score ≥ -1 is normal, T-score between -1 and -2.5 is osteopenia and T-score ≤ -2.5 is osteoporosis. In Pakistan, it has been found that out of 171 million population, 40.18 million were osteopenic and 9.91 million were osteoporotic. By 2020,it is predicted to move upto 11.3 million and 12.91 million by 2050 [4].

It develops virtually fourfold less in males than in females as males have giant skeletons, their bone loss starts later and develops slowly, and that they don't expertise changing hormonal secretion and bone loss[4]. In clinical practice, postmenopausal and age-related osteoporosis are the most common and major forms of bone loss seen. However, younger people can also suffer from this disease[5]. A study conducted in Iran showed that bone mass was low in 29-39 years age group. Another study in Saudi Arabia showed that high parity and prolonged lactation are causes of low BMD in women less than 35 years of age. Prevalence of osteopenia is high among young women, i.e., 64% in less than 30 years of age and 55% in those 31-45 years of age. A study conducted in KPK Pakistan showed that 47.7% women were osteopenic and 24.7% were having osteoporosis [6].

By origin both osteopenia and osteoporosis are complex of different factors, as there are many causal factors of bone health including nutrition and physical activity. Prevalence of osteopenia in Pakistani females is high due to high intake of fast food, calcium deficient diet and sedentary life style. A study was conducted in primary health care department of Karachi revealed that 30.7% participants were osteoporotic and 44.5% were having osteopenia [1]. It was mainly due to less physical activity, less intake of calcium supplements, inadequate sun exposure, tobacco intake. Non-contagious illness like diabetes and depression has robust relation with low bone mineral density [7].

Corresponding Author:

Dr. Hamayun Suqrat Hassan Imam
Professor Department of Community Medicine, Aziz Fatima Medical and Dental College, Faisalabad.
Email: dr_hamayun786@hotmail.com

Measurement of bone mass during mature life give information about bone development during an tepartum stage until adultery and also amount of bone loss during old age. The most important causal factor of peak bone mass is considered to be hereditary [8].

Osteopenia and osteoporosis diagnosis is mainly done with measurement of bone mineral density with ultrasound or by dual-energy X-ray absorptiometry (DEXA) scan. DEXA scan is gold standard for measurement of bone mineral density. However, measurement of bone mineral density by ultrasound is non-intrusive, less expensive and available easily than DEXA. In ultrasonic method, calcaneus bone is used to measure bone mineral density and converted into T-score after comparing with normal adult population values [9].

Pakistani population suffered from osteopenia and osteoporosis in millions. Osteoporosishas become a public health concern as the available statistical data is on the osteoporosis and prevalence of (osteoporotic) hip fractures per year is not clear [7]. An appreciation of the frequency of osteopenia in conjunction with its association with risk factors can provide the premise for establishing stronger and cheaper programs of prevention, and guard against the reasons of osteoporosis. This study was conducted to gauge the osteopenia and osteoporosis frequency in females from hostel of Punjab Medical College, Faisalabad.

METHODOLOGY:

A cross-sectional study from 1st June 2014 to 31st August 2014 was conducted in Liaqat and Fatima hall of Punjab Medical College Hostels, Faisalabad. Non-probability convenient sampling was used to collect data.

After ethical review committee approval, the study was conducted in Punjab Medical College hostels Faisalabad. The date and timing of camp was displayed on notice boards one week before this activity. The procedure was verbally explained to them. By using non-probability convenient sampling technique, 212 female students of MBBS, who were resident of Punjab Medical College hostels were included in study, while students on steroid therapy were excluded from study. Pre-designed questionnaires were used to collect data regarding age, demographics and physical activit status. Calcaneal quantitative ultrasound (osteo Sys Sonost 3000 Ac10B1110271) was used to test BMD. Test was performed free of cost.

Data Analysis: Data were analyzed by using SPSS (Statistical Package for Social Sciences) version 17. Descriptive statistics were applied; categorical variables were calculated by frequencies. For comparison of groups chi-square test was used. Results of the study were considered significant if p-value was ≤ 0.05. Participants of study were divided into three groups based on WHO criteria of T score normal, osteopenic and osteoporotic.

RESULTS:

Out of 212 female participants, 70 (33%) females belong to age group of <20 years, 80 (38%) of 21-22 years and 62 (29%) have ≥ 23 years, our study results showed that 81(38%) females were osteoporotic, 123 (58%) have osteopenia and 8 (4%) were normal in above groups with p value of 0.035 (Table-I). The distribution of female medical students according to five years of MBBS is shown in table-II.

Significant association was found between five years of MBBS and T scores with p<0.001 (Table-III).

Table-I: Age Group of Participants.

Age group (years)	N (%)
≤ 20	70 (33.0)
21 – 22	80 (37.7)
> 22	62 (29.2)
Total	212 (100.0)

Table-II: MBBS Class Distribution.

Class	N (%)
1st year	44 (20.7)
2nd year	22 (10.4)
3rd year	19 (9.0)
4th year	122 (57.5)
Final year	5 (2.4)
Total	212 (100.0)

Table-III: Comparison of variables/characteristics among normal, osteopenia and osteoporotic individuals

Characteristics	Number	Normal n(%)	Osteopenia n(%)	Osteoporosis n(%)	p-value
Age Group	<20 years= 70	2 (2.86)	32(45.71)	36(51.43)	0.035
	21-22 years= 80	3(3.75)	47(58.75)	30(37.50)	
	>23 years=62	3(4.84)	44(70.97)	15(24.19)	
MBBS Class Group	1st year=44	0(0.00)	21(47.73)	23(52.27)	< 0.001
	2nd year=22	1(4.55)	11(50.00)	10(45.45)	
	3rd year=19	1(5.26)	9(47.37)	9(47.37)	
	4th year=122	4(3.28)	81(66.39)	37(30.33)	
	Final year=5	2(40.00)	1(20.00)	2(40.00)	
Regular exercise	Yes=50	4(8.00)	32(64.00)	14(28.00)	0.071
	No =162	4(2.47)	91(56.17)	67(41.36)	

In our study 50 (24%) participants did regular exercise, and 162 (76%) did not do regular exercise, out of 50 participants doing regular exercise 14 (17%) were osteoporotic and 32 (26%) were having osteopenia. Similarly in 162 participants not doing regular exercise, 67 (82%) were osteoporotic and 91 (74%) were suffering from osteopenia with p-value=0.071.

DISCUSSION:

Osteoporosis is a serious public health concern with common metabolic and skeletal disorder; it has been neglected in several developing countries like Pakistan due to several reasons. One main cause is the assumption that osteoporosis could be an ineluctable consequence of ageing and misconception that osteoporosis is an illness of industrialized countries[10].

The results of our study showed that osteopenia was the prime metabolic disorder in young female students. This is comparable to a study conducted in Karachi, which revealed that osteopenia was prevalent among females between 20-30 year's [1]. Another study in Karachi showed that low bone mass was significantly associated with female gender[11]. Also, it was revealed in Saudi Arabia thatosteopenia was more prevalent among females of this age group[12]. However, in contrast to our study, osteopenia prevalence was found less in female of age group 20-29 years (17.4%) in Tehran [13].

The results of our study showed a significant association between MBBS class group and T score with p<0.001. This is comparable to a study conducted in India where 27.7% of female medical students had low BMD values [14] . However, in contrast to our results, a study conducted in Pakistan showed that with increase in level of education, there is increase possibility of good health and bone mineral density [15].

Our study results showed that 50(24%) participants did regular exercise, and 162 (76%) did not do regular exercise, out of 50 participants doing regular exercise 14 (17%) were osteoporotic and 32 (26%) were having osteopenia. Similarly in 162 participants not doing regular exercise, 67 (82%) were osteoporotic and 91 (74%) were suffering from osteopenia with p-value of 0.071. This is in agreement of a study which showed the significant association between daily exercise and T score with p-value of < 0.05[2]. Another study showed that low mineral density was not associated with participants involved in regular physical activity as compared to those who did not work out daily or have sedentary life styles[11,16]. Similarly,in Nigeria, it has been observed that osteoporosis prevalence was high among younger ages due to non-participation in sports and occupational activities [17].

LIMITATION OF STUDY:

Firstly, in our study, we did not use DEXA scan to measure bone mineral density as it was expensive and has radiation hazards. Secondly, cross sectional design may have over or underrated osteopenia and osteoporosis among females.

CONCLUSION:

It is concluded that frequency of osteopenia and osteoporosis was high among female medical students residing in hostel. To address this serious public health issues, health education should be provided. Modifiable risk factors like life style modification can improve bone health. More researches are required for accurate estimation of prevalence of osteopenia and osteoporosis among Pakistani population.

RECOMMENDATIONS:

There is need to change the life style of female students residing in hostels. To bring this change massive scale community education on bone healthy habits throughout life ought to be promoted through electronic and print media. Whereas the genetic predisposition cannot be modified, emphasis on prevention can be expected to result in lesser girls suffering from osteopenia and there by reduction in the morbidity relating to it.

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AUTHORS CONTRIBUTION:

Hamayun Suqrat Hassan Imam: Principal contributor, conceptualization and design of research work, data collection and statistical analysis.

Uzma Sagheer: Writing of manuscript, results analysis, data collection, drafting, literature search, and reference collection.

Tahir Ismail: Literature search, revision of manuscript.

Muhammad Khalid Saddiqui: Drafting, acquisition and final approval of the version to be published.

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